

Diorygma fuscum sp. nov. from China

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ABSTRACT—A new lichen species, *Diorygma fuscum*, is described from Fujian Province, China. It is characterized by the conspicuous open immersed lirellae with densely white pruinose discs, the hyaline to brownish muriform ascospores sized 40–60 × 12–18 µm, and the presence of stictic acid. The type specimen is deposited in HMAS-L.

KEY WORDS—*Ascomycota*, *Ostropales*, *Graphidaceae*, taxonomy

Introduction

Diorygma Eschw. (*Graphidaceae*) is mainly a tropical to subtropical genus (Staiger 2002; Kalb et al. 2004), characterized by its inconspicuous pseudocortex, lirellate ascocarps with a pruinose disc, branched or anastomosing paraphyses with a thick gelatinous wall, *Graphis*-type 1–8-spored asci, ascospores that are transversely septate with lenticular spore locules or muriform, and the presence of norstictic, stictic, and/or protocetraric acid. At present, more than 50 species are known worldwide (Kalb et al. 2004; Cáceres 2007; Archer 2009; Makhija et al. 2009; Sharma & Makhija 2009a, b; Sharma & Khadilkar 2012; Lima et al. 2013; Feuerstein et al. 2014; Sutjaritturakan et al. 2014).

Nine *Diorygma* species have been reported from China: *D. hieroglyphicum*, *D. hololeucum*, *D. junghuhnii* [= *Graphina mendax*], *D. macgregorii*, *D. megasporum*, *D. pachygraphum*, *D. poitaei* [= *Graphina virginea*], *D. pruinoseum*, and *D. soozanum* [= *Graphina soozana*] (Jia & Wei 2016, Kalb et al. 2004, Lamb 1963, Meng & Wei 2008, Nakanishi et al. 2003, Thrower 1988, Wang Yang & Lai 1973, Wei 1991, Wei et al. 2013, Wu & Qian 1989, Zahlbruckner 1933). Here we describe a new species collected in Fujian Province, China, for which we propose the name *Diorygma fuscum*.

Materials & methods

Specimens are housed in Herbarium Mycologicum Academiae Sinicae-Lichenes, Beijing, China (HMAS-L). A dissecting microscope (Olympus SZX12) and a light microscope (Olympus BX51 & Nikon Eclipse-55i) were used for the morphological and anatomical studies. Measurements and illustrations were taken from the manual cross-sections of fruit bodies in water. Amyloidity of the ascospores was tested using Lugol's solution. Spot tests with KOH (20%) were performed on the thallus surface and on thin thallus sections. The lichen substances were detected and identified by thin-layer chromatography (Culberson & Kristinsson 1970; Culberson 1972; White & James 1985).

Taxonomy

Diorygma fuscum Jian Li bis & Z.F. Jia, **sp. nov.**

PL. 1

FUNGAL NAME FN 570263

Differs from *Diorygma pruinosum* by its smaller ascospores and the presence of stictic acid.

TYPE: China. Fujian Province, Jianou City, Fangdao Town, Wanmulin, 27°02'N 118°08'E, alt. 310 m, on bark, 3/VI/2007, Q.F. Meng FJ1280 (**Holotype**, HMAS-L 137193).

ETYMOLOGY: The epithet refers to the brownish mature muriform ascospores.

THALLUS crustose, pale grey to olive-grey, 60–100 µm thick, surface uneven to slightly rugose or warty, without soralia or isidia; PSEUDOCORTEX indistinctly developed, 5–10 µm thick, partly lacking; ALGAL LAYER 30–40 µm thick; MEDULLA poorly developed.

ASCOCARPS numerous, lirellate, often flexuous branched, immersed in the thallus when young, becoming open and ± raised when older, whitish, powdery, acute or rounded at the ends, 1–4 × 0.3–2 mm; DISC surrounded by entire (in young apothecia) raised thalline margins, opened, rarely ± convex, with thick and white pruina, often showing fissures when older; EXCIPIE divergent, laterally uncarbonized, rudimentarily developed, consisting of a weakly and irregularly or brownish hyphal tissue intermingled with parts of the substrate, carbonization sometimes restricted to the basal position; HYMENIUM 100–180 µm high, not interspersed, I+ weakly bluish violet; EPITHECIUM usually distinctly developed, consisting of intermingled anastomosing, hyaline or brownish paraphysis tips with short ± globular cells, hyaline granules, and dead hyphae; PARAPHYSES 1–2 µm diam., with a thick gelatinous wall, often anastomosing, especially in the upper part of the hymenium and near the asci. ASCOSPORES 8 per ascus, hyaline to brownish (when mature), muriform, spore locules of equal size, often arranged in rows, 10–14/3–4-locular, 40–60 × 12–18 µm, I+ violet, with thin halo.

PYCNIDIA not seen.

CORTICOLOUS.



PLATE 1. (holotype, HMAS-L 137193). A. Thallus with apothecia; B. Cross-section of apothecium; C. Asci with ascospores, showing the thickened top of ascus; D. Asci with hyaline to brownish ascospores. E. Ascus with brownish ascospores. F. Mature ascospore with thin halo. Scale bars: A = 1 mm; B = 100 μ m; C–F = 20 μ m.

CHEMISTRY: Stictic acid (major), constictic, hypostictic and hypoconstictic acids (minor, trace or absent).

ADDITIONAL SPECIMENS EXAMINED: CHINA. FUJIAN PROVINCE, Jianou City, Fangdao Town, Wangmulin, alt. 400 m, 1/VI/2007, Q.F. Meng FJ1059 (HMAS-L 137198); alt. 420 m, 1/VI/2007, Q.F. Meng FJ860 (HMAS-L 137197); alt. 310 m, 3/VI/2007, Q.F. Meng FJ697 (HMAS-L 137196), FJ1278 (HMAS-L 137195), FJ1279 (HMAS-L 137194); alt. 300 m, 3/VI/2007, J. Li FJ630 (HMAS-L 137200); alt. 540 m, 2/VI/2007, J. Li FJ1066 (HMAS-L 137199).

ECOLOGY. *Diorygma fuscum* grows on bark in relatively dry and open situations from lowland primeval forests in subtropical area of China. Associated lichens include *Graphis hossei* Vain. and other species of *Graphidaceae* and *Lecanora*.

REMARKS: *Diorygma fuscum* is morphologically similar to *D. pruinsum* (Eschw.) Kalb et al., which differs in having 1-spored asci, larger ascospores (95–170 $\times$ 19–50 μ m), and the presence of protocetraric acids. The new lichen

species also resembles *D. erythrellum* (Mont. & Bosch) Kalb et al. and *D. poitaei* (Fée) Kalb et al. in producing 8-spores per ascus and similarly sized muriform ascospores ($30\text{--}65 \times 12\text{--}20 \mu\text{m}$ in *D. erythrellum*; $40\text{--}65 \times 10\text{--}18 \mu\text{m}$ in *D. poitaei*), but differs in having opened discs, a slightly carbonized proper exciple at the base, and the presence of stictic acid (major); *D. erythrellum* differs in containing norstictic acid (major), connorstictic acid (minor or trace), and stictic acid (trace or absent), while *D. poitaei* contains hypostictic and hypoconstictic acids (major) and α -acetylhypoconstictic, constictic, and stictic acids (minor, trace or absent) (Kalb et al. 2004).

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